

## SEQUENCE LISTING

<110> KIRCHHOFF, LOUIS V  
KEIKO, ÔTSU

<120> RECOMBINANT POLYPEPTIDES FOR DIAGNOSING INFECTION WITH  
TRYPANOSOMA CRUZI

<130> PNL21311A

<150> US 60/430,654

<151> 2002-04-02

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<170> PatentIn version 3.2

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Val Tyr Tyr Gly Arg Thr Ala Gly Pro Ile Val His Gln Thr Val Gln  
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ccg tac aaa tgg cgc tca tga ctt gtt tgt gtc gga cac ggg caa atc 192  
Pro Tyr Lys Trp Arg Ser Leu Val Cys Val Gly His Gly Gln Ile  
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 Thr His His Phe Cys Pro Thr Ser Glu Lys Asn Val His His Ser Val  
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 Phe Asp Val Cys His Leu Gln Phe His Glu Asn Ser Cys Asp Tyr  
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Ala Gly Ala Gln Phe Asp Leu Arg Gln Gln Gln Leu Val Ile Gln Asp  
      -1 1            5            10

Phe Phe Ile Ser Arg Ser Cys Ala Gly Cys Ser Gln Gly Gln Thr Asp  
15 20 25

Gly Pro Ser Gly Ala Gly Thr Leu Phe Thr Ala Ala Gly Gly Ser Leu  
30 35 40 45

Gly Lys Asp Ala Ser Thr Leu Leu Leu Cys Asp Gln Gly Gly Gly Gly  
50 55 60

Ser Ser Val Arg Leu Val Asn Lys Ser Gly Ile Phe Thr Leu Ala Gly  
65 70 75

Ser Lys Thr Thr Arg Gly Asn Gln Asn Gly Pro Ala Ala Thr Ala Leu  
80 85 90

Phe Asn Met Pro Arg Ala Val Val Leu Glu Asp Gly Ala Leu Tyr Val  
95 100 105

Ala Asp Ser Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Ile Val  
110 115 120 125

Thr Ser Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro  
130 135 140

Tyr Ser Arg Pro Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly  
145 150 155

Lys Ser Arg Ile Ile Phe Ala Pro Leu Gln Lys Gln Thr Phe Ile Thr  
160 165 170

Val Phe Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys  
175 180 185

Ser Arg Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ser Ile  
190 195 200 205

Asn Met Gln Gly Ala Thr Thr Pro Lys Asp Tyr Trp Gln Val Gly Asn  
210 215 220

Ala Asp Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu  
225 230 235

Asp Lys Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met  
240 245 250

Ser Leu Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro  
255 260 265

Asp Val Leu Leu Arg Trp Pro His Gly Pro Ile Val Ser Leu Val Asn  
270 275 280 285

Ile Asn Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile  
290 295 300

Val His Asp Gly Ser Tyr His Pro Thr Val Thr Pro Thr Pro Pro Leu  
305 310 315

Thr Pro Thr Pro Thr Pro Glu Val Thr Pro Thr Pro Thr Val Thr Pro  
320 325 330

Thr Pro Thr Pro Glu Val Thr Pro Thr Pro Pro Val Thr Pro Ser Pro  
335 340 345

Thr Ile Thr Ile His Arg Gly Phe Ala Val Ala Ala Phe Pro Ala Gln  
350 355 360 365

Ser Leu Pro Ile Glu Asp Pro Arg Leu Met His Glu Leu Leu Ser Trp  
370 375 380

Leu Met Lys Asp Val Gly Ile Ala Phe Glu Ser Thr Asp Phe Phe Ala  
385 390 395

Val Phe Pro Pro Asp Arg Glu Val Leu Val Pro Gly Tyr Val Asn Val  
400 405 410

Ser Thr Trp Asn Asn Leu Thr Val Leu Phe Asn Phe Asp Arg Thr Ile  
415 420 425

Val Ile Thr Glu Tyr Phe Thr Pro Glu Gly Met Ser Ser Glu Glu Gly  
430 435 440 445

Gln Ala Arg Leu Phe Ala Ser Pro Trp Tyr Trp Thr Arg Asn Phe Leu  
450 455 460

Asp Ser Leu Lys Lys Thr Val Ala Trp Lys Asp Leu Glu Ala Phe Cys  
465 470 475

Met Val Asn Cys Val Glu His Cys Glu Thr Met Thr Phe His Lys Ser  
480 485 490

Glu Cys Val Gly Tyr Val Arg Pro Pro Val Cys Asn Asp Val Cys Val  
495 500 505

Gly Ala Val Val Ser Ser Val Val Leu Gly Ala Thr Gly Ile Ala Leu  
510 515 520 525

Ile Ala Leu Met Val Gly Ser Ser Ala Asn Leu Arg Ser Ala Val Ile  
530 535 540

Leu Val Pro Pro Met  
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aat gcc aac aac ctc gtt cga gaa atc tcc aat ggc gtt gtc act tcg 96  
Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
20 25 30

ttt att acg gaa gga ctg ctg ggc cca tcg tac atc aaa ccg tac agc 144  
Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
35 40 45

cgt aca aat ggc gct cat gac ttg ttt gtg tcg gac acg ggc aaa tca 192  
Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
50 55 60

cgc atc att ttt gcc cca cct cag aaa aaa acg ttc atc aca gtg ttt 240  
Arg Ile Ile Phe Ala Pro Pro Gln Lys Lys Thr Phe Ile Thr Val Phe  
65 70 75 80

ata aca gga ttc cag ccg gat gtt ctt caa att agc gag aag agt cgt 288  
Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys Ser Arg  
85 90 95

ttg atg ttt gcc atc tgc aat tcc acg aaa att ctt gcg att aat atg 336  
Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ala Ile Asn Met  
100 105 110

cag gga gcc aca acc ccg aag gag tac tgg caa gtt gga aat gcg gac 384  
Gln Gly Ala Thr Thr Pro Lys Glu Tyr Trp Gln Val Gly Asn Ala Asp  
115 120 125

tgc atg ggc tat cag agt tcc ctc atg ctc acg acc gag gag gat aaa 432  
Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu Asp Lys  
130 135 140

ctc ctc tac tac ggc ata tta aat gga acc cca tcc atc atg tct tta 480  
Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met Ser Leu  
145 150 155 160

ccc gcc acc aaa acg aag acg gaa gca ccc aga att tgc ccg gat gtg 528  
Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro Asp Val  
165 170 175

ttg ttg cag tgg cca cat ggg ccc att gtt tcg ctt gtg aat att aac 576  
Leu Leu Gln Trp Pro His Gly Pro Ile Val Ser Leu Val Asn Ile Asn  
180 185 190

aaa cat gca ttt tac gtt gtt acc gcc tcc aat gta tac att gta cat 624  
Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile Val His  
195 200 205

gat ggc tcg tat cat ccg act gga tcc atg gcc cag ctc caa cag gca 672  
Asp Gly Ser Tyr His Pro Thr Gly Ser Met Ala Gln Leu Gln Gln Ala  
210 215 220

gaa aat aat atc act aat tcc aaa aaa gaa atg aca aag cta cga gaa 720  
Glu Asn Asn Ile Thr Asn Ser Lys Lys Glu Met Thr Lys Leu Arg Glu  
225 230 235 240

aaa gtg aaa aag gcc gag aaa gaa aaa ttg gac gcc att aac cgg gca 768  
Lys Val Lys Lys Ala Glu Lys Glu Lys Leu Asp Ala Ile Asn Arg Ala  
245 250 255

acc aag ctg gaa gag gaa cga aac caa gcg tac aaa gca gca cac aag 816  
Thr Lys Leu Glu Glu Glu Arg Asn Gln Ala Tyr Lys Ala Ala His Lys  
260 265 270

gca gag gag gaa aag gct aaa aca ttt caa cgc ctt ata aca ttt gag 864  
Ala Glu Glu Glu Lys Ala Lys Thr Phe Gln Arg Leu Ile Thr Phe Glu  
275 280 285

tcg gaa aat att aac tta aag aaa agg cca aat gac gca gtt tca aat 912  
Ser Glu Asn Ile Asn Leu Lys Lys Arg Pro Asn Asp Ala Val Ser Asn  
290 295 300

cgg gat aag aaa aaa aat tct gaa acc gca aaa act gac gaa gta gag 960  
Arg Asp Lys Lys Lys Asn Ser Glu Thr Ala Lys Thr Asp Glu Val Glu  
305 310 315 320

aaa cag agg gcg gct gag gct gcc aag gcc gtg gag acg gag aag cag 1008  
Lys Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln  
325 330 335

agg gca gct gag gcc acg aag gtt gcc gaa gcg gag aag cgg aag gca 1056  
Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Arg Lys Ala  
340 345 350

gct gag gcc gcc aag gcc gtg gag acg gag aag cag agg gca gct gaa 1104  
Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu  
355 360 365

gcc acg aag gtt gcc gaa gcg gag aag cag aag gca gct gag gcc gcc 1152  
Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala  
370 375 380

aag gcc gtg gag acg gag aag cag agg gca gct gaa gcc acg aag gtt 1200  
Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr Lys Val  
385 390 395 400

gcc gaa gcg gag aag cag agg gca gct gaa gcc atg aag gtt gcc gaa 1248  
Ala Glu Ala Glu Lys Gln Arg Ala Ala Glu Ala Met Lys Val Ala Glu  
405 410 415

gcg gag aag cag aag gca gct gag gcc gcc aag gcc gtg gag acg gag 1296  
Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu  
420 425 430

aag cag agg gca gct gaa gcc acg aag gtt gcc gaa gcg gag aag cag 1344  
Lys Gln Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln  
435 440 445

aag gca gct gag gcc gcc aag gcc gtg gag acg gag aag cag agg gca 1392  
Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala  
450 455 460



gct gaa gcc acg aag gtt gcc gaa gcg gag aag cag aag gca gct gag 1440  
Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu  
465 470 475 480

gcc gcc aag gcc gtg gag acg gag aag cag agg gca gct gaa gcc acg 1488  
Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr  
485 490 495

aag gtt gcc gaa gcg gag aag gat atc gat ccc atg ggt gct tgt ggg 1536  
Lys Val Ala Glu Ala Glu Lys Asp Ile Asp Pro Met Gly Ala Cys Gly  
500 505 510

tcg aag gac tcg acg agc gac aag ggg ttg gcg agc gat aag gac ggc 1584  
Ser Lys Asp Ser Thr Ser Asp Lys Gly Leu Ala Ser Asp Lys Asp Gly  
515 520 525

aag aac gcc aag gac cgc aag gaa gcg tgg gag cgc att cgc cag gcg 1632  
Lys Asn Ala Lys Asp Arg Lys Glu Ala Trp Glu Arg Ile Arg Gln Ala  
530 535 540

att cct cgt gag aag acc gcc gag gca aaa cag cgc cgc atc gag etc 1680  
Ile Pro Arg Glu Lys Thr Ala Glu Ala Lys Gln Arg Arg Ile Glu Leu  
545 550 555 560

ttc aag aag ttc gac aag aac gag acc ggg aag ctg tgc tac gat gag 1728  
Phe Lys Lys Phe Asp Lys Asn Glu Thr Gly Lys Leu Cys Tyr Asp Glu  
565 570 575

gtg cac agc ggc tgc ctc gag gtg ctg aag ttg gac gag ttc acg ccg 1776  
Val His Ser Gly Cys Leu Glu Val Leu Lys Leu Asp Glu Phe Thr Pro  
580 585 590

cga gtg cgc gac atc acg aag cgt gca ttc gac aag gcg agg gcc ctg 1824  
Arg Val Arg Asp Ile Thr Lys Arg Ala Phe Asp Lys Ala Arg Ala Leu  
595 600 605

ggc agc aag ctg gag aac aag ggc tcc gag gac ttt gtt gaa ttt ctg 1872  
Gly Ser Lys Leu Glu Asn Lys Gly Ser Glu Asp Phe Val Glu Phe Leu  
610 615 620

gag ttc cgt ctg atg ctg tgc tac atc tac gac ttc ttc gag ctg acg 1920  
Glu Phe Arg Leu Met Leu Cys Tyr Ile Tyr Asp Phe Phe Glu Leu Thr  
625 630 635 640

gtg atg ttc gac gag att gac gcc tcc ggc aac atg ctg gtt gac gag 1968  
Val Met Phe Asp Glu Ile Asp Ala Ser Gly Asn Met Leu Val Asp Glu  
645 650 655

gag gag ttc aag cgc gcc gtg ccc aag ctt gag gcg tgg ggc gcc aag 2016  
Glu Glu Phe Lys Arg Ala Val Pro Lys Leu Glu Ala Trp Gly Ala Lys  
660 665 670

gtc gag gat ccc gcg gcg ctg ttc aag gag ctc gat aag aac ggc act 2064  
Val Glu Asp Pro Ala Ala Leu Phe Lys Glu Leu Asp Lys Asn Gly Thr  
675 680 685

ggg tcc gtg acg ttc gac gag ttt gct gcg tgg gct tct gca gtc aaa 2112  
Gly Ser Val Thr Phe Asp Glu Phe Ala Ala Trp Ala Ser Ala Val Lys  
690 695 700

ctg gac gcc gac ggc gac ccg gac aac gtg ccg gat atc 2151  
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705 710 715

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<400> 36

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Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
20 25 30

Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
35 40 45

Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
50 55 60

Arg Ile Ile Phe Ala Pro Pro Gln Lys Lys Thr Phe Ile Thr Val Phe  
65                    70                    75                    80

Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys Ser Arg  
                  85                    90                    95

Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ala Ile Asn Met  
                  100                    105                    110

Gln Gly Ala Thr Thr Pro Lys Glu Tyr Trp Gln Val Gly Asn Ala Asp  
                  115                    120                    125

Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu Asp Lys  
                  130                    135                    140

Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met Ser Leu  
145                    150                    155                    160

Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro Asp Val  
                  165                    170                    175

Leu Leu Gln Trp Pro His Gly Pro Ile Val Ser Leu Val Asn Ile Asn  
                  180                    185                    190

Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile Val His  
                  195                    200                    205

Asp Gly Ser Tyr His Pro Thr Gly Ser Met Ala Gln Leu Gln Gln Ala  
                  210                    215                    220

Glu Asn Asn Ile Thr Asn Ser Lys Lys Glu Met Thr Lys Leu Arg Glu  
225                    230                    235                    240

Lys Val Lys Lys Ala Glu Lys Glu Lys Leu Asp Ala Ile Asn Arg Ala  
245 250 255

Thr Lys Leu Glu Glu Glu Arg Asn Gln Ala Tyr Lys Ala Ala His Lys  
260 265 270

Ala Glu Glu Glu Lys Ala Lys Thr Phe Gln Arg Leu Ile Thr Phe Glu  
275 280 285

Ser Glu Asn Ile Asn Leu Lys Lys Arg Pro Asn Asp Ala Val Ser Asn  
290 295 300

Arg Asp Lys Lys Lys Asn Ser Glu Thr Ala Lys Thr Asp Glu Val Glu  
305 310 315 320

Lys Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln  
325 330 335

Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Arg Lys Ala  
340 345 350

Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu  
355 360 365

Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala  
370 375 380

Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr Lys Val  
385 390 395 400

Ala Glu Ala Glu Lys Gln Arg Ala Ala Glu Ala Met Lys Val Ala Glu  
405 410 415

Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu  
420 425 430

Lys Gln Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln  
435 440 445

Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala  
450 455 460

Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu  
465 470 475 480

Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr  
485 490 495

Lys Val Ala Glu Ala Glu Lys Asp Ile Asp Pro Met Gly Ala Cys Gly  
500 505 510

Ser Lys Asp Ser Thr Ser Asp Lys Gly Leu Ala Ser Asp Lys Asp Gly  
515 520 525

Lys Asn Ala Lys Asp Arg Lys Glu Ala Trp Glu Arg Ile Arg Gln Ala  
530 535 540

Ile Pro Arg Glu Lys Thr Ala Glu Ala Lys Gln Arg Arg Ile Glu Leu  
545 550 555 560

Phe Lys Lys Phe Asp Lys Asn Glu Thr Gly Lys Leu Cys Tyr Asp Glu  
565 570 575

Val His Ser Gly Cys Leu Glu Val Leu Lys Leu Asp Glu Phe Thr Pro  
580 585 590

Arg Val Arg Asp Ile Thr Lys Arg Ala Phe Asp Lys Ala Arg Ala Leu  
595 600 605

Gly Ser Lys Leu Glu Asn Lys Gly Ser Glu Asp Phe Val Glu Phe Leu  
610 615 620

Glu Phe Arg Leu Met Leu Cys Tyr Ile Tyr Asp Phe Phe Glu Leu Thr  
625 630 635 640

Val Met Phe Asp Glu Ile Asp Ala Ser Gly Asn Met Leu Val Asp Glu  
645 650 655

Glu Glu Phe Lys Arg Ala Val Pro Lys Leu Glu Ala Trp Gly Ala Lys  
660 665 670

Val Glu Asp Pro Ala Ala Leu Phe Lys Glu Leu Asp Lys Asn Gly Thr  
675 680 685

Gly Ser Val Thr Phe Asp Glu Phe Ala Ala Trp Ala Ser Ala Val Lys  
690 695 700

Leu Asp Ala Asp Gly Asp Pro Asp Asn Val Pro Asp Ile  
705 710 715

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gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag 96  
Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
20 25 30

gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag 144  
Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
35 40 45

aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc 192  
Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
50 55 60

gac ttt gtt gct atg gag cag gag cgc agg cag ctg ctc gag aag gac 240  
Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp  
65 70 75 80

ccg cgc agg aac gcg aag gag atc gct gcg ctt gag gag agc atg aat 288  
Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn  
85 90 95

gcc cgc gca cag gag ctg gca cgc gag aag aag ctt gct gac cgc gcg 336  
Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala  
100 105 110

ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc 384  
Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu  
115 120 125

gac gac gac agc gac ttt gtt gct atg gag cag gag cgc agg cag ctg 432  
Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu  
130 135 140

ctc gag aag gac ccg cgc agg aac gcg aag gag atc gct gcg ctt gag 480  
Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu  
145 150 155 160

gag agc atg aat gcc cgc gca cag gag ctg gca cgc gag aag aag ctt 528  
Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu  
165 170 175

gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga 576  
Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg  
180 185 190

gag ctg ccg ctc gac gac gac agc gac ttt gtt gct atg gag cag gag 624  
Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu  
195 200 205

cgc agg cag ctg ctc gag aag gac ccg cgc agg aac gcg aag gag atc 672  
Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile  
210 215 220

gct gcg ctt gag gag agc atg aat gcc cgc gca cag gag ctg gca cgc 720  
Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg  
225 230 235 240

gag aag aag ctt gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc 768  
Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly  
245 250 255

gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc gac ttt gtt gct 816  
Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala  
260 265 270

atg gag cag gag cgc agg cag ctg ctc gag aag gac ccg cgc agg aac 864  
Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn  
275 280 285

gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag 912  
Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
290 295 300



gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag 960  
Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
305 310 315 320

aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc 1008  
Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
325 330 335

gac ttt gtt gct atg gag cag gag cgc agg cag ctg ctc gag aag gac 1056  
Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp  
340 345 350

ccg cgc agg aac gcg aag gag atc gct gcg ctt gag gag agc atg aat 1104  
Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn  
355 360 365

gcc cgc gca cag gag ctg gca cgc gag aag aag ctt gct gac cgc gcg 1152  
Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala  
370 375 380

ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc 1200  
Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu  
385 390 395 400

gac gac gac agc gac ttt gtt gct atg gag cag gag cgc agg cag ctg 1248  
Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu  
405 410 415

ctc gag aag gac ccg cgc agg aac gcg aag gag atc gct gcg ctt gag 1296  
Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu  
420 425 430

gag agc atg aat gcc cgc gca cag gag ctg gca cgc gag aag aag ctt 1344  
Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu  
435 440 445

gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga 1392  
Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg  
450 455 460

gag ctg ccg ctc gac gac gac agc gac ttt gtt gct atg gag cag gag 1440  
Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu  
465 470 475 480

cgc agg cag ctg ctc gag aag gac ccg cgc agg aac gcg aag gag atc 1488  
Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile  
485 490 495

gct gcg ctt gag gag agc atg aat gcc cgc gca cag gag ctg gca cgc 1536  
Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg  
500 505 510

gag aag aag ctt gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc 1584  
Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly  
515 520 525

gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc gac ttt gtt gct 1632  
Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala  
530 535 540

atg gag cag gag cgc agg cag ctg ctc gag aag gac ccg cgc agg aac 1680  
Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn  
545 550 555 560

gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag 1728  
Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
565 570 575

gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag 1776  
Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
580 585 590

aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc 1824  
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595 600 605

gac ttt gtt gct 1836  
Asp Phe Val Ala  
610

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<211> 612  
<212> PRT  
<213> T CRUZI

<400> 38

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Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
20 25 30

Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
35 40 45

Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
50 55 60

Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp  
65 70 75 80

Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn  
85 90 95

Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala  
100 105 110

Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu  
115 120 125

Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu  
130 135 140

Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu  
145 150 155 160

Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu  
165 170 175

Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg  
180 185 190

Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu  
195 200 205

Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile  
210 215 220

Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg  
225 230 235 240

Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly  
245 250 255

Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala  
260 265 270

Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn  
275 280 285

Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
290 295 300

Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
305 310 315 320

Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
325 330 335

Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp  
340 345 350

Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn  
355 360 365

Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala  
370 375 380

Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu  
385 390 395 400

Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu  
405 410 415

Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu  
420 425 430

Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu  
435 440 445

Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg  
450 455 460

Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu  
465 470 475 480

Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile  
485 490 495

Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg  
500 505 510

Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly  
515 520 525

Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala  
530 535 540

Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn  
545 550 555 560

Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
565 570 575

Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
580 585 590

Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
595 600 605

Asp Phe Val Ala  
610

<210> 39  
<211> 621  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(621)

<400> 39  
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Phe Asn Pro Ser Thr Asp Lys Leu Lys Leu Asn Gln Gln Asn Lys Pro  
1 5 10 15

cat att gca aat aat aaa caa aaa aca aca ctc gaa aaa act caa aca 96  
 His Ile Ala Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr  
 20 25 30

gaa caa aaa aca gcg cca ttt gga cag ggc gca gca ggg tgg aca aaa 144  
 Glu Gln Lys Thr Ala Pro Phe Gly Gln Gly Ala Ala Gly Trp Thr Lys  
 35 40 45

cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 192  
 Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
 50 55 60

gga cag gcc gca gca ggt gac aaa cca cca cca ttt gga cag gcc gca 240  
 Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe Gly Gln Ala Ala  
 65 70 75 80

gca ggt gac aaa cca tca cta ttt gga cag gcc gca gca ggt gac aaa 288  
 Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala Ala Gly Asp Lys  
 85 90 95

cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 336  
 Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
 100 105 110

gga cag gcc gca gca ggt gac aaa cca tca cta ttt gga cag gcc gca 384  
 Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
 115 120 125

gca ggt gac aaa cca tca cca ttt gga cag gcc gca gca ggt gac aaa 432  
 Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys  
 130 135 140

cca cca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 480  
 Pro Pro Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
 145 150 155 160

gga cag gcc gca gca ggt gac aaa cca tca cta ttt gga cag gcc gca 528  
 Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
 165 170 175

gca ggt gac aaa cca tca cca ttt gga cag gga act gcg ttt gat gcc 576  
 Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Gly Thr Ala Phe Asp Ala  
 180 185 190

tct cga agc act gtg ttt gcg aat gcg cct ggt gtt gcc cag gtg 621  
Ser Arg Ser Thr Val Phe Ala Asn Ala Pro Gly Val Ala Gln Val  
195 200 205

<210> 40  
<211> 207  
<212> PRT  
<213> T CRUZI

<400> 40

Phe Asn Pro Ser Thr Asp Lys Leu Lys Leu Asn Gln Gln Asn Lys Pro  
1 5 10 15

His Ile Ala Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr  
20 25 30

Glu Gln Lys Thr Ala Pro Phe Gly Gln Gly Ala Ala Gly Trp Thr Lys  
35 40 45

Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
50 55 60

Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe Gly Gln Ala Ala  
65 70 75 80

Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala Ala Gly Asp Lys  
85 90 95

Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
100 105 110

Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
115 120 125



Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys  
130 135 140

Pro Pro Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
145 150 155 160

Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
165 170 175

Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Gly Thr Ala Phe Asp Ala  
180 185 190

Ser Arg Ser Thr Val Phe Ala Asn Ala Pro Gly Val Ala Gln Val  
195 200 205

<210> 41  
<211> 1845  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(1845)

<400> 41  
ttt aat cct tct acg gac aaa ttg aag cta aac caa caa aat aag cct 48  
Phe Asn Pro Ser Thr Asp Lys Leu Lys Leu Asn Gln Gln Asn Lys Pro  
1 5 10 15

cat att gca aat aat aaa caa aaa aca aca ctc gaa aaa act caa aca 96  
His Ile Ala Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr  
20 25 30

gaa caa aaa aca gcg cca ttt gga cag ggc gca gca ggg tgg aca aaa 144  
Glu Gln Lys Thr Ala Pro Phe Gly Gln Gly Ala Ala Gly Trp Thr Lys  
35 40 45

cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 192  
Pro Ser Pro Phe Gly Gln Ala Ala Gly Asp Lys Pro Pro Pro Phe  
50 55 60

gga cag gcc gca gca ggt gac aaa cca cca cca ttt gga cag gcc gca 240  
Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe Gly Gln Ala Ala  
65 70 75 80

gca ggt gac aaa cca tca cta ttt gga cag gcc gca gca ggt gac aaa 288  
Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala Ala Gly Asp Lys  
85 90 95

cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 336  
Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
100 105 110

gga cag gcc gca gca ggt gac aaa cca tca cta ttt gga cag gcc gca 384  
Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
115 120 125

gca ggt gac aaa cca tca cca ttt gga cag gcc gca gca ggt gac aaa 432  
Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys  
130 135 140

cca cca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 480  
Pro Pro Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
145 150 155 160

gga cag gcc gca gca ggt gac aaa cca tca cta ttt gga cag gcc gca 528  
Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
165 170 175

gca ggt gac aaa cca tca cca ttt gga cag gga act gcg ttt gat gcc 576  
Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Gly Thr Ala Phe Asp Ala  
180 185 190

tct cga agc act gtg ttt gcg aat gcg cct ggt gtt gcc cag gtg atg 624  
Ser Arg Ser Thr Val Phe Ala Asn Ala Pro Gly Val Ala Gln Val Met  
195 200 205

gag cag gag cgc agg cag ctg ctc gag aag gac ccg cgc agg aac gcg 672  
Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala  
210 215 220

aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag gag 720

Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu  
225                    230                    235                    240

ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag aag    768  
Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys  
                  245                    250                    255

ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc gac    816  
Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp  
                  260                    265                    270

ttt gtt gct atg gag cag gag cgc agg cag ctg ctc gag aag gac ccg    864  
Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro  
                  275                    280                    285

cgc agg aac gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc    912  
Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala  
                  290                    295                    300

cgc gca cag gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc    960  
Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe  
305                    310                    315                    320

ctc gac cag aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac    1008  
Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp  
                  325                    330                    335

gac gac agc gac ttt gtt gct atg gag cag gag cgc agg cag ctg ctc    1056  
Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu  
                  340                    345                    350

gag aag gac ccg cgc agg aac gcg aag gag atc gct gcg ctt gag gag    1104  
Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu  
                  355                    360                    365

agc atg aat gcc cgc gca cag gag ctg gca cgc gag aag aag ctt gct    1152  
Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala  
                  370                    375                    380

gac cgc gcg ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga gag    1200  
Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu  
385                    390                    395                    400

ctg ccg ctc gac gac gac agc gac ttt gtt gct atg gag cag gag cgc 1248  
Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg  
405 410 415

agg cag ctg ctc gag aag gac ccg cgc agg aac gcg aag gag atc gct 1296  
Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala  
420 425 430

gcg ctt gag gag agc atg aat gcc cgc gca cag gag ctg gca cgc gag 1344  
Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu  
435 440 445

aag aag ctt gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc gtg 1392  
Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val  
450 455 460

ccg ctg cga gag ctg ccg ctc gac gac gac agc gac ttt gtt gct atg 1440  
Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met  
465 470 475 480

gag cag gag cgc agg cag ctg ctc gag aag gac ccg cgc agg aac gcg 1488  
Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala  
485 490 495

aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag gag 1536  
Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu  
500 505 510

ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag aag 1584  
Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys  
515 520 525

ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc gac 1632  
Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp  
530 535 540

ttt gtt gct atg gag cag gag cgc agg cag ctg ctc gag aag gac ccg 1680  
Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro  
545 550 555 560

cgc agg aac gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc 1728  
Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala  
565 570 575

cgc gca cag gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc 1776  
 Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe  
 580 585 590

ctc gac cag aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac 1824  
 Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp  
 595 600 605

gac gac agc gac ttt gtt gct 1845  
 Asp Asp Ser Asp Phe Val Ala  
 610 615

<210> 42  
 <211> 615  
 <212> PRT  
 <213> T CRUZI

<400> 42

Phe Asn Pro Ser Thr Asp Lys Leu Lys Leu Asn Gln Gln Asn Lys Pro  
 1 5 10 15

His Ile Ala Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr  
 20 25 30

Glu Gln Lys Thr Ala Pro Phe Gly Gln Gly Ala Ala Gly Trp Thr Lys  
 35 40 45

Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
 50 55 60

Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe Gly Gln Ala Ala  
 65 70 75 80

Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala Ala Gly Asp Lys  
 85 90 95

Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
100 105 110

Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
115 120 125

Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys  
130 135 140

Pro Pro Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
145 150 155 160

Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala  
165 170 175

Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Gly Thr Ala Phe Asp Ala  
180 185 190

Ser Arg Ser Thr Val Phe Ala Asn Ala Pro Gly Val Ala Gln Val Met  
195 200 205

Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala  
210 215 220

Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu  
225 230 235 240

Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys  
245 250 255

Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp  
260 265 270

Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro  
275 280 285

Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala  
290 295 300

Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe  
305 310 315 320

Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp  
325 330 335

Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu  
340 345 350

Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu  
355 360 365

Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala  
370 375 380

Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu  
385 390 395 400

Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg  
405 410 415

Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala  
420 425 430

Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu  
435 440 445

Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val  
450 455 460

Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met  
465 470 475 480

Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala  
485 490 495

Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu  
500 505 510

Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys  
515 520 525

Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp  
530 535 540

Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro  
545 550 555 560

Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala  
565 570 575

Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe  
580 585 590

Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp  
595 600 605

Asp Asp Ser Asp Phe Val Ala  
610 615



<210> 43  
<211> 858  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(858)

<400> 43  
gat cca acg tat cgt ttt gca aac cac gcg ttc acg ctg gtg gcg tcg 48  
Asp Pro Thr Tyr Arg Phe Ala Asn His Ala Phe Thr Leu Val Ala Ser  
1 5 10 15

gtg acg att cac gag gtt ccg agc gtc gcg agt cct ttg ctg ggt gcg 96  
Val Thr Ile His Glu Val Pro Ser Val Ala Ser Pro Leu Leu Gly Ala  
20 25 30

agc ctg gac tct tct ggt ggc aaa aaa ctc ctg ggg ctc tcg tac gac 144  
Ser Leu Asp Ser Ser Gly Gly Lys Lys Leu Leu Gly Leu Ser Tyr Asp  
35 40 45

gag aag cac cag tgg cag cca ata tac gga tca acg ccg gtg acg ccg 192  
Glu Lys His Gln Trp Gln Pro Ile Tyr Gly Ser Thr Pro Val Thr Pro  
50 55 60

acc gga tcg tgg gag atg ggt aag agg tac cac gtg gtt ctt acg atg 240  
Thr Gly Ser Trp Glu Met Gly Lys Arg Tyr His Val Val Leu Thr Met  
65 70 75 80

gcg aat aaa att ggc tcc gtg tac att gat gga gaa cct ctg gag ggt 288  
Ala Asn Lys Ile Gly Ser Val Tyr Ile Asp Gly Glu Pro Leu Glu Gly  
85 90 95

tca ggg cag acc gtt gtg cca gac gag agg acg cct gac atc tcc cac 336  
Ser Gly Gln Thr Val Val Pro Asp Glu Arg Thr Pro Asp Ile Ser His  
100 105 110

ttc tac gtt ggc ggg tat gga agg agt gat atg cca acc ata agc cac 384  
Phe Tyr Val Gly Gly Tyr Gly Arg Ser Asp Met Pro Thr Ile Ser His  
115 120 125

gtg acg gtg aat aat gtt ctt ctt tac aac cgt cag ctg aat gcc gag 432  
Val Thr Val Asn Asn Val Leu Leu Tyr Asn Arg Gln Leu Asn Ala Glu  
130 135 140

gag atc agg acc ttg ttc ttg agc cag gac ctg att ggc acg gaa gca 480  
Glu Ile Arg Thr Leu Phe Leu Ser Gln Asp Leu Ile Gly Thr Glu Ala  
145 150 155 160

cac atg ggc agc agc agc ggc agc agt gcc cac ggt acg ccc tcg att 528  
His Met Gly Ser Ser Ser Gly Ser Ser Ala His Gly Thr Pro Ser Ile  
165 170 175

ccc gtt gac agc agt gcc cac ggt aca ccc tcg act ccc gtt gac agc 576  
Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser  
180 185 190

agt gcc cac ggt acg ccc tcg act ccc gtt gac agc agt gcc cac ggt 624  
Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly  
195 200 205

aca ccc tcg act ccc gtt gac agc agt gcc cac ggt aca ccc tcg act 672  
Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr  
210 215 220

ccc gtt gac agc agt gcc cac ggt aag ccc tcg act ccc gct gac agc 720  
Pro Val Asp Ser Ser Ala His Gly Lys Pro Ser Thr Pro Ala Asp Ser  
225 230 235 240

agt gcc cac agt acg ccc tcg act ccc gct gac agc agt gcc cac agt 768  
Ser Ala His Ser Thr Pro Ser Thr Pro Ala Asp Ser Ser Ala His Ser  
245 250 255

acg ccc tca att ccc gct gac agc agt gcc cac agt acg ccc tca gct 816  
Thr Pro Ser Ile Pro Ala Asp Ser Ser Ala His Ser Thr Pro Ser Ala  
260 265 270

ccc gct gac aac ggc gcc aat ggt acg gtt ttg att ttg tcg 858  
Pro Ala Asp Asn Gly Ala Asn Gly Thr Val Leu Ile Leu Ser  
275 280 285

<210> 44  
<211> 286  
<212> PRT  
<213> T CRUZI

<400> 44

Asp Pro Thr Tyr Arg Phe Ala Asn His Ala Phe Thr Leu Val Ala Ser  
1 5 10 15

Val Thr Ile His Glu Val Pro Ser Val Ala Ser Pro Leu Leu Gly Ala  
20 25 30

Ser Leu Asp Ser Ser Gly Gly Lys Lys Leu Leu Gly Leu Ser Tyr Asp  
35 40 45

Glu Lys His Gln Trp Gln Pro Ile Tyr Gly Ser Thr Pro Val Thr Pro  
50 55 60

Thr Gly Ser Trp Glu Met Gly Lys Arg Tyr His Val Val Leu Thr Met  
65 70 75 80

Ala Asn Lys Ile Gly Ser Val Tyr Ile Asp Gly Glu Pro Leu Glu Gly  
85 90 95

Ser Gly Gln Thr Val Val Pro Asp Glu Arg Thr Pro Asp Ile Ser His  
100 105 110

Phe Tyr Val Gly Gly Tyr Gly Arg Ser Asp Met Pro Thr Ile Ser His  
115 120 125

Val Thr Val Asn Asn Val Leu Leu Tyr Asn Arg Gln Leu Asn Ala Glu  
130 135 140

Glu Ile Arg Thr Leu Phe Leu Ser Gln Asp Leu Ile Gly Thr Glu Ala  
145 150 155 160

His Met Gly Ser Ser Ser Gly Ser Ser Ala His Gly Thr Pro Ser Ile  
165 170 175

Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser  
180 185 190

Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly  
195 200 205

Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr  
210 215 220

Pro Val Asp Ser Ser Ala His Gly Lys Pro Ser Thr Pro Ala Asp Ser  
225 230 235 240

Ser Ala His Ser Thr Pro Ser Thr Pro Ala Asp Ser Ser Ala His Ser  
245 250 255

Thr Pro Ser Ile Pro Ala Asp Ser Ser Ala His Ser Thr Pro Ser Ala  
260 265 270

Pro Ala Asp Asn Gly Ala Asn Gly Thr Val Leu Ile Leu Ser  
275 280 285

<210> 45  
<211> 701  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(699)

<400> 45  
act cat gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc 48

Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala  
1 5 10 15

ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc 96  
Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro  
20 25 30

gac cac ttc cgc tcg acc tcg acg act cat gac gcg tac agg ccc gtt 144  
Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val  
35 40 45

gat ccc tcg gcg tac aag cgc gcc ttg ccg cag gaa gag caa gag gat 192  
Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp  
50 55 60

gtg ggg ccg cgc cac gtt gat ccc gac cac ttc cgc tcg acg act cat 240  
Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His  
65 70 75 80

gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg 288  
Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
85 90 95

cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac 336  
Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
100 105 110

ttc cgc tcg acc tcg acg act cat gac gcg tac agg ccc gtt gat ccc 384  
Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro  
115 120 125

tcg gcg tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg 432  
Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly  
130 135 140

ccg cgc cac gtt gat ccc gac cac ttc cgc tcg acc tcg acg act cat 480  
Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His  
145 150 155 160

gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg 528  
Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
165 170 175

cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac 576  
Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
180 185 190

ttc cgc tcg acg act cat gac gcg tac agg ccc gtt gat ccc tcg gcg 624  
Phe Arg Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala  
195 200 205

tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc 672  
Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg  
210 215 220

cac gtt gat ccc gac cac ttc cgc tcg ac 701  
His Val Asp Pro Asp His Phe Arg Ser  
225 230

<210> 46  
<211> 233  
<212> PRT  
<213> T CRUZI

<400> 46

Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala  
1 5 10 15

Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro  
20 25 30

Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val  
35 40 45

Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp  
50 55 60

Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His  
65 70 75 80

Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
85 90 95

Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
100 105 110

Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro  
115 120 125

Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly  
130 135 140

Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His  
145 150 155 160

Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
165 170 175

Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
180 185 190

Phe Arg Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala  
195 200 205

Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg  
210 215 220

His Val Asp Pro Asp His Phe Arg Ser  
225 230

<210> 47  
<211> 1557  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(1557)

<400> 47  
gat cca acg tat cgt ttt gca aac cac gcg ttc acg ctg gtg gcg tcg 48  
Asp Pro Thr Tyr Arg Phe Ala Asn His Ala Phe Thr Leu Val Ala Ser  
1 5 10 15

gtg acg att cac gag gtt ccg agc gtc gcg agt cct ttg ctg ggt gcg 96  
Val Thr Ile His Glu Val Pro Ser Val Ala Ser Pro Leu Leu Gly Ala  
20 25 30

agc ctg gac tct tct ggt ggc aaa aaa ctc ctg ggg ctc tcg tac gac 144  
Ser Leu Asp Ser Ser Gly Gly Lys Lys Leu Leu Gly Leu Ser Tyr Asp  
35 40 45

gag aag cac cag tgg cag cca ata tac gga tca acg ccg gtg acg ccg 192  
Glu Lys His Gln Trp Gln Pro Ile Tyr Gly Ser Thr Pro Val Thr Pro  
50 55 60

acc gga tcg tgg gag atg ggt aag agg tac cac gtg gtt ctt acg atg 240  
Thr Gly Ser Trp Glu Met Gly Lys Arg Tyr His Val Val Leu Thr Met  
65 70 75 80

gcg aat aaa att ggc tcc gtg tac att gat gga gaa cct ctg gag ggt 288  
Ala Asn Lys Ile Gly Ser Val Tyr Ile Asp Gly Glu Pro Leu Glu Gly  
85 90 95

tca ggg cag acc gtt gtg cca gac gag agg acg cct gac atc tcc cac 336  
Ser Gly Gln Thr Val Val Pro Asp Glu Arg Thr Pro Asp Ile Ser His  
100 105 110

ttc tac gtt ggc ggg tat gga agg agt gat atg cca acc ata agc cac 384  
Phe Tyr Val Gly Gly Tyr Gly Arg Ser Asp Met Pro Thr Ile Ser His  
115 120 125



gtg acg gtg aat aat gtt ctt ctt tac aac cgt cag ctg aat gcc gag 432  
Val Thr Val Asn Asn Val Leu Leu Tyr Asn Arg Gln Leu Asn Ala Glu  
130 135 140

gag atc agg acc ttg ttc ttg agc cag gac ctg att ggc acg gaa gca 480  
Glu Ile Arg Thr Leu Phe Leu Ser Gln Asp Leu Ile Gly Thr Glu Ala  
145 150 155 160

cac atg ggc agc agc agc ggc agc agt gcc cac ggt acg ccc tcg att 528  
His Met Gly Ser Ser Ser Gly Ser Ser Ala His Gly Thr Pro Ser Ile  
165 170 175

ccc gtt gac agc agt gcc cac ggt aca ccc tcg act ccc gtt gac agc 576  
Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser  
180 185 190

agt gcc cac ggt acg ccc tcg act ccc gtt gac agc agt gcc cac ggt 624  
Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly  
195 200 205

aca ccc tcg act ccc gtt gac agc agt gcc cac ggt aca ccc tcg act 672  
Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr  
210 215 220

ccc gtt gac agc agt gcc cac ggt aag ccc tcg act ccc gct gac agc 720  
Pro Val Asp Ser Ser Ala His Gly Lys Pro Ser Thr Pro Ala Asp Ser  
225 230 235 240

agt gcc cac agt acg ccc tcg act ccc gct gac agc agt gcc cac agt 768  
Ser Ala His Ser Thr Pro Ser Thr Pro Ala Asp Ser Ser Ala His Ser  
245 250 255

acg ccc tca att ccc gct gac agc agt gcc cac agt acg ccc tca gct 816  
Thr Pro Ser Ile Pro Ala Asp Ser Ser Ala His Ser Thr Pro Ser Ala  
260 265 270

ccc gct gac aac ggc gcc aat ggt acg gtt ttg att ttg tcg act cat 864  
Pro Ala Asp Asn Gly Ala Asn Gly Thr Val Leu Ile Leu Ser Thr His  
275 280 285

gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg 912  
Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
290 295 300

cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac 960  
Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
305 310 315 320

ttc cgc tcg acc tcg acg act cat gac gcg tac agg ccc gtt gat ccc 1008  
Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro  
325 330 335

tcg gcg tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg 1056  
Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly  
340 345 350

ccg cgc cac gtt gat ccc gac cac ttc cgc tcg acg act cat gac gcg 1104  
Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His Asp Ala  
355 360 365

tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg cag gaa 1152  
Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu  
370 375 380

gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac ttc cgc 1200  
Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg  
385 390 395 400

tcg acc tcg acg act cat gac gcg tac agg ccc gtt gat ccc tcg gcg 1248  
Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala  
405 410 415

tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc 1296  
Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg  
420 425 430

cac gtt gat ccc gac cac ttc cgc tcg acc tcg acg act cat gac gcg 1344  
His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala  
435 440 445

tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg cag gaa 1392  
Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu  
450 455 460

gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac ttc cgc 1440  
Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg  
465 470 475 480

tcg acg act cat gac gcg tac agg ccc gtt gat ccc tog gcg tac aag 1488  
Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys  
485 490 495

cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt 1536  
Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val  
500 505 510

gat ccc gac cac ttc cgc tcg 1557  
Asp Pro Asp His Phe Arg Ser  
515

<210> 48  
<211> 519  
<212> PRT  
<213> T CRUZI

<400> 48

Asp Pro Thr Tyr Arg Phe Ala Asn His Ala Phe Thr Leu Val Ala Ser  
1 5 10 15

Val Thr Ile His Glu Val Pro Ser Val Ala Ser Pro Leu Leu Gly Ala  
20 25 30

Ser Leu Asp Ser Ser Gly Gly Lys Lys Leu Leu Gly Leu Ser Tyr Asp  
35 40 45

Glu Lys His Gln Trp Gln Pro Ile Tyr Gly Ser Thr Pro Val Thr Pro  
50 55 60

Thr Gly Ser Trp Glu Met Gly Lys Arg Tyr His Val Val Leu Thr Met  
65 70 75 80

Ala Asn Lys Ile Gly Ser Val Tyr Ile Asp Gly Glu Pro Leu Glu Gly  
85 90 95

Ser Gly Gln Thr Val Val Pro Asp Glu Arg Thr Pro Asp Ile Ser His  
100 105 110

Phe Tyr Val Gly Gly Tyr Gly Arg Ser Asp Met Pro Thr Ile Ser His  
115 120 125

Val Thr Val Asn Asn Val Leu Leu Tyr Asn Arg Gln Leu Asn Ala Glu  
130 135 140

Glu Ile Arg Thr Leu Phe Leu Ser Gln Asp Leu Ile Gly Thr Glu Ala  
145 150 155 160

His Met Gly Ser Ser Ser Gly Ser Ser Ala His Gly Thr Pro Ser Ile  
165 170 175

Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser  
180 185 190

Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly  
195 200 205

Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr  
210 215 220

Pro Val Asp Ser Ser Ala His Gly Lys Pro Ser Thr Pro Ala Asp Ser  
225 230 235 240

Ser Ala His Ser Thr Pro Ser Thr Pro Ala Asp Ser Ser Ala His Ser  
245 250 255

Thr Pro Ser Ile Pro Ala Asp Ser Ser Ala His Ser Thr Pro Ser Ala  
260 265 270

Pro Ala Asp Asn Gly Ala Asn Gly Thr Val Leu Ile Leu Ser Thr His  
275 280 285

Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
290 295 300

Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
305 310 315 320

Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro  
325 330 335

Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly  
340 345 350

Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His Asp Ala  
355 360 365

Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu  
370 375 380

Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg  
385 390 395 400

Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala  
405 410 415

Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg  
420 425 430

His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala  
435 440 445

Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu  
450 455 460

Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg  
465 470 475 480

Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys  
485 490 495

Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val  
500 505 510

Asp Pro Asp His Phe Arg Ser  
515

<210> 49  
<211> 1521  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(1521)

<400> 49  
atg gcc cga gct gtg gtg ctt gag gat gga gcg ctt tac gtg gcg gac 48  
Met Ala Arg Ala Val Val Leu Glu Asp Gly Ala Leu Tyr Val Ala Asp  
1 5 10 15

aat gcc aac aac ctc gtt cga gaa atc tcc aat ggc gtt gtc act tcg 96  
Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
20 25 30

ttt att acg gaa gga ctg ctg ggc cca tcg tac atc aaa ccg tac agc 144  
Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
35 40 45

cgt aca aat ggc gct cat gac ttg ttt gtg tgg gac acg ggc aaa tca 192  
 Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
     50            55            60

cgc atc att ttt gcc cca cct cag aaa aaa acg ttc atc aca gtg ttt 240  
 Arg Ile Ile Phe Ala Pro Pro Gln Lys Lys Thr Phe Ile Thr Val Phe  
     65            70            75            80

ata aca gga ttc cag ccg gat gtt ctt caa att agc gag aag agt cgt 288  
 Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys Ser Arg  
             85            90            95

ttg atg ttt gcc atc tgc aat tcc acg aaa att ctt gcg att aat atg 336  
 Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ala Ile Asn Met  
             100            105            110

cag gga gcc aca acc ccg aag gag tac tgg caa gtt gga aat gcg gac 384  
 Gln Gly Ala Thr Thr Pro Lys Glu Tyr Trp Gln Val Gly Asn Ala Asp  
             115            120            125

tgc atg ggc tat cag agt tcc ctc atg ctc acg acc gag gag gat aaa 432  
 Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu Asp Lys  
             130            135            140

ctc ctc tac tac ggc ata tta aat gga acc cca tcc atc atg tct tta 480  
 Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met Ser Leu  
     145            150            155            160

ccc gcc acc aaa acg aag acg gaa gca ccc aga att tgc ccg gat gtg 528  
 Pro Ala Thr Lys Lys Thr Glu Ala Pro Arg Ile Cys Pro Asp Val  
             165            170            175

ttg ttg cag tgg cca cat ggg ccc att gtt tgg ctt gtg aat att aac 576  
 Leu Leu Gln Trp Pro His Gly Pro Ile Val Ser Leu Val Asn Ile Asn  
             180            185            190

aaa cat gca ttt tac gtt gtt acc gcc tcc aat gta tac att gta cat 624  
 Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile Val His  
             195            200            205

gat ggc tgg tat cat ccg act gga tcc atg gcc cag ctc caa cag gca 672  
 Asp Gly Ser Tyr His Pro Thr Gly Ser Met Ala Gln Leu Gln Gln Ala  
     210            215            220

gaa aat aat atc act aat tcc aaa aaa gaa atg aca aag cta cga gaa 720  
 Glu Asn Asn Ile Thr Asn Ser Lys Lys Glu Met Thr Lys Leu Arg Glu  
 225 230 235 240

aaa gtg aaa aag gcc gag aaa gaa aaa ttg gac gcc att aac cgg gca 768  
 Lys Val Lys Lys Ala Glu Lys Glu Lys Leu Asp Ala Ile Asn Arg Ala  
 245 250 255

acc aag ctg gaa gag gaa cga aac caa gcg tac aaa gca gca cac aag 816  
 Thr Lys Leu Glu Glu Arg Asn Gln Ala Tyr Lys Ala Ala His Lys  
 260 265 270

gca gag gag gaa aag gct aaa aca ttt caa cgc ctt ata aca ttt gag 864  
 Ala Glu Glu Glu Lys Ala Lys Thr Phe Gln Arg Leu Ile Thr Phe Glu  
 275 280 285

tcg gaa aat att aac tta aag aaa agg cca aat gac gca gtt tca aat 912  
 Ser Glu Asn Ile Asn Leu Lys Lys Arg Pro Asn Asp Ala Val Ser Asn  
 290 295 300

cgg gat aag aaa aaa aat tct gaa acc gca aaa act gac gaa gta gag 960  
 Arg Asp Lys Lys Lys Asn Ser Glu Thr Ala Lys Thr Asp Glu Val Glu  
 305 310 315 320

aaa cag agg gcg gct gag gct gcc aag gcc gtg gag acg gag aag cag 1008  
 Lys Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln  
 325 330 335

agg gca gct gag gcc acg aag gtt gcc gaa gcg gag aag cgg aag gca 1056  
 Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Arg Lys Ala  
 340 345 350

gct gag gcc gcc aag gcc gtg gag acg gag aag cag agg gca gct gaa 1104  
 Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu  
 355 360 365

gcc acg aag gtt gcc gaa gcg gag aag cag aag gca gct gag gcc gcc 1152  
 Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala  
 370 375 380

aag gcc gtg gag acg gag aag cag agg gca gct gaa gcc acg aag gtt 1200  
 Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr Lys Val  
 385 390 395 400



gcc gaa gcg gag aag cag agg gca gct gaa gcc atg aag gtt gcc gaa 1248  
Ala Glu Ala Glu Lys Gln Arg Ala Ala Glu Ala Met Lys Val Ala Glu  
405 410 415

gcg gag aag cag aag gca gct gag gcc gcc aag gcc gtg gag acg gag 1296  
Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu  
420 425 430

aag cag agg gca gct gaa gcc acg aag gtt gcc gaa gcg gag aag cag 1344  
Lys Gln Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln  
435 440 445

aag gca gct gag gcc gcc aag gcc gtg gag acg gag aag cag agg gca 1392  
Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala  
450 455 460

gct gaa gcc acg aag gtt gcc gaa gcg gag aag cag aag gca gct gag 1440  
Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu  
465 470 475 480

gcc gcc aag gcc gtg gag acg gag aag cag agg gca gct gaa gcc acg 1488  
Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr  
485 490 495

aag gtt gcc gaa gcg gag aag gat atc gat ccc 1521  
Lys Val Ala Glu Ala Glu Lys Asp Ile Asp Pro  
500 505

<210> 50  
<211> 507  
<212> PRT  
<213> T CRUZI

<400> 50

Met Ala Arg Ala Val Val Leu Glu Asp Gly Ala Leu Tyr Val Ala Asp  
1 5 10 15

Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
20 25 30

Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
35 40 45

Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
50 55 60

Arg Ile Ile Phe Ala Pro Pro Gln Lys Lys Thr Phe Ile Thr Val Phe  
65 70 75 80

Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys Ser Arg  
85 90 95

Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ala Ile Asn Met  
100 105 110

Gln Gly Ala Thr Thr Pro Lys Glu Tyr Trp Gln Val Gly Asn Ala Asp  
115 120 125

Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu Asp Lys  
130 135 140

Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met Ser Leu  
145 150 155 160

Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro Asp Val  
165 170 175

Leu Leu Gln Trp Pro His Gly Pro Ile Val Ser Leu Val Asn Ile Asn  
180 185 190

Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile Val His  
195 200 205

Asp Gly Ser Tyr His Pro Thr Gly Ser Met Ala Gln Leu Gln Gln Ala  
210 215 220

Glu Asn Asn Ile Thr Asn Ser Lys Lys Glu Met Thr Lys Leu Arg Glu  
225 230 235 240

Lys Val Lys Lys Ala Glu Lys Glu Lys Leu Asp Ala Ile Asn Arg Ala  
245 250 255

Thr Lys Leu Glu Glu Glu Arg Asn Gln Ala Tyr Lys Ala Ala His Lys  
260 265 270

Ala Glu Glu Glu Lys Ala Lys Thr Phe Gln Arg Leu Ile Thr Phe Glu  
275 280 285

Ser Glu Asn Ile Asn Leu Lys Lys Arg Pro Asn Asp Ala Val Ser Asn  
290 295 300

Arg Asp Lys Lys Lys Asn Ser Glu Thr Ala Lys Thr Asp Glu Val Glu  
305 310 315 320

Lys Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln  
325 330 335

Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Arg Lys Ala  
340 345 350

Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu  
355 360 365

Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala  
370 375 380

Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr Lys Val  
385                    390                    395                    400

Ala Glu Ala Glu Lys Gln Arg Ala Ala Glu Ala Met Lys Val Ala Glu  
405                    410                    415

Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu  
420                    425                    430

Lys Gln Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln  
435                    440                    445

Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala  
450                    455                    460

Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu  
465                    470                    475                    480

Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr  
485                    490                    495

Lys Val Ala Glu Ala Glu Lys Asp Ile Asp Pro  
500                    505

<210> 1

<211> 34

<212> PRT

<213> T. CRUZI

<400> Sequence: 51

Ser Thr Asp Lys Leu Lys Leu Asn Gln Gln Asn Lys Pro His Ile Ala  
1                    5                    10                    15

Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr Glu Gln Lys  
20 25 30

Thr Ala

<210> 2  
<211> 12  
<212> PRT  
<213> T. CRUZI

<400> Sequence: 52

Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser  
1 5 10

<210> 3  
<211> 21  
<212> PRT  
<213> T. CRUZI

<400> Sequence: 53

Gly Thr Ala Phe Asp Ala Ser Arg Ser Thr Val Phe Ala Asn Ala Pro  
1 5 10 15

Gly Val Ala Gln Val  
20

<210> 4  
<211> 68  
<212> PRT  
<213> T. CRUZI

<400> Sequence: 54

Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn  
1            5            10            15

Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
20            25            30

Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
35            40            45

Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
50            55            60

Asp Phe Val Ala  
65

<210> 5  
<211> 85  
<212> PRT  
<213> T. CRUZI

<400> Sequence: 55

Met Ala Gln Leu Gln Gln Ala Glu Asn Asn Ile Thr Asn Ser Lys Lys  
1            5            10            15

Glu Met Thr Lys Leu Arg Glu Lys Val Lys Lys Ala Glu Lys Glu Lys  
20            25            30

Leu Asp Ala Ile Asn Arg Ala Thr Lys Leu Glu Glu Glu Arg Asn Gln  
35            40            45

Ala Tyr Lys Ala Ala His Lys Ala Glu Glu Glu Lys Ala Lys Thr Phe  
50            55            60

Gln Arg Leu Ile Thr Phe Glu Ser Glu Asn Ile Asn Leu Lys Lys Arg  
65            70            75            80

Pro Asn Asp Ala Val  
85

<210> 6  
<211> 14  
<212> PRT  
<213> T. CRUZI

<400> Sequence: 56

Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys  
1            5            10

<210> 7  
<211> 214  
<212> PRT  
<213> T. CRUZI

<400> Sequence: 57

Asp Ile Asp Pro Met Gly Ala Cys Gly Ser Lys Asp Ser Thr Ser Asp  
1            5            10            15

Lys Gly Leu Ala Ser Asp Lys Asp Gly Lys Asn Ala Lys Asp Arg Lys  
20            25            30

Glu Ala Trp Glu Arg Ile Arg Gln Ala Ile Pro Arg Glu Lys Thr Ala  
35            40            45

Glu Ala Lys Gln Arg Arg Ile Glu Leu Phe Lys Lys Phe Asp Lys Asn  
50            55            60

Glu Thr Gly Lys Leu Cys Tyr Asp Glu Val His Ser Gly Cys Leu Glu  
65            70            75            80

Val Leu Lys Leu Asp Glu Phe Thr Pro Arg Val Arg Asp Ile Thr Lys  
85            90            95

Arg Ala Phe Asp Lys Ala Arg Ala Leu Gly Ser Lys Leu Glu Asn Lys  
100            105            110

Gly Ser Glu Asp Phe Val Glu Phe Leu Glu Phe Arg Leu Met Leu Cys  
115            120            125

Tyr Ile Tyr Asp Phe Phe Glu Leu Thr Val Met Phe Asp Glu Ile Asp  
130            135            140

Ala Ser Gly Asn Met Leu Val Asp Glu Glu Glu Phe Lys Arg Ala Val  
145            150            155            160



Pro Lys Leu Glu Ala Trp Gly Ala Lys Val Glu Asp Pro Ala Ala Leu  
165 170 175

Phe Lys Glu Leu Asp Lys Asn Gly Thr Gly Ser Val Thr Phe Asp Glu  
180 185 190

Phe Ala Ala Trp Ala Ser Ala Val Lys Leu Asp Ala Asp Gly Asp Pro  
195 200 205

Asp Asn Val Pro Asp Ile  
210